Develop A Community Resilience Plan

Ch 4: Determine Goals and Objectives

Presenter:

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Ch 4. Determine Goals and Objectives

- Establish Long-Term Community Goals
- Establish Desired Performance Goals for the Built Environment
  - Recovery phases
  - Performance levels for buildings
  - Functional levels for building clusters and infrastructure systems
- Community Hazards and Levels
  - Prevailing Hazards
  - Hazard Levels (3)
  - Hazard Impact
- Anticipated Performance of Existing Built Environment
  - Anticipated Recovery of Function
- Summarize the Results
Establish Long Term Community Goals

Long Term goals that improve the community can guide the prioritization and implementation process.

- Improve reliability of infrastructure systems
- Enhance community functions
- Reduce travel time impacts to residents and businesses.
- Revitalize an existing blighted area
Establish Desired Performance Goals for the Built Environment

• Define in terms of extent of damage and time needed to restore functionality.
• Used to help prioritize repair and reconstruction efforts.
• Based on the needs of the social institutions and local economy and their dependencies.
• Should also consider the role of a facility or system outside of the community.
• Suggests criteria for new and retrofit of existing construction.
Recovery of the Built Environment

Organize around restoring functionality over time

When is each cluster and system needed for recovery?

Source: National Disaster Recovery Framework
Functionality Needs For Recovery

• **Short-Term:** Secure, Rescue, Stabilize, Clear Routes
  • Clusters: Critical Facilities, Emergency Housing Related Infrastructure Systems

• **Intermediate:** Restore Neighborhoods, meet social needs
  • Clusters: Housing, healthcare, main street, schools, Churches Related Infrastructure Systems

• **Long-Term:** Community Social and Economic Recovery
  • Clusters: Commercial and Industrial Businesses Related Infrastructure Systems
Performance Levels for Buildings

- **Level of Functionality** after the event
  - Operational (Short term)
  - Useable during Repair (Short to intermediate term)
  - Not Usable (Intermediate to long term)
  - Collapse (Mitigate when possible)

- **Recovery Time**
  - Days (Short term)
  - Weeks (Intermediate term)
  - Months (Long term)
Functionality Levels During Recovery

Buildings clusters & supporting infrastructure systems

- Individual buildings assigned performance that reflects role in the community
- Building clusters serve social needs and institutions and need a measure of functionality

<table>
<thead>
<tr>
<th>Category</th>
<th>Performance Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>30% functional</td>
<td>Minimum number needed to initiate the activities assigned to the cluster</td>
</tr>
<tr>
<td>60% functional</td>
<td>Minimum number needed to initiate usual operations</td>
</tr>
<tr>
<td>90% functional</td>
<td>Minimum number needed to declare cluster is operating at normal capacity</td>
</tr>
</tbody>
</table>
Set Desired Performance Goals

Recovery of building clusters and supporting infrastructure can be expressed as a percentage of functional building's in a cluster

30% Initiate assigned activities
60% Initiate usual operations
90% Operating at normal capacity
Determine and Characterize Hazards

- **Prevalent Hazards**
  - Wind, Earthquake, Inundation
  - Fire, Snow, Rain
  - Human caused or Technological

- **Hazard Level:**
  - Routine Level that is expected to occur frequently
  - Expected Level equal to the design level used for buildings
  - Extreme Level that is the maximum considered possible

- **Hazard Impact:**
  - Area affected Defined as “local, community, or regional”
  - Disruption Level Defined as “minor, moderate, or severe”
## Hazard Impact Examples

<table>
<thead>
<tr>
<th>Event</th>
<th>Community</th>
<th>Year</th>
<th>Level</th>
<th>Affected Area</th>
<th>Disruption Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>DaVinci Apt Fire</td>
<td>Los Angeles</td>
<td>2014</td>
<td>Extreme</td>
<td>Localized</td>
<td>Minor</td>
</tr>
<tr>
<td>Moore OK Tornado</td>
<td>Moore</td>
<td>2013</td>
<td>Extreme</td>
<td>Localized</td>
<td>Moderate</td>
</tr>
<tr>
<td>Loma Prieta EQ</td>
<td>Watsonville</td>
<td>1989</td>
<td>Expected</td>
<td>Regional</td>
<td>Severe</td>
</tr>
<tr>
<td>Loma Prieta EQ</td>
<td>San Francisco</td>
<td>1989</td>
<td>Expected</td>
<td>Community</td>
<td>Moderate</td>
</tr>
<tr>
<td>Superstorm Sandy</td>
<td>New Jersey</td>
<td>2012</td>
<td>Routine</td>
<td>Regional</td>
<td>Moderate</td>
</tr>
<tr>
<td>(wind)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Superstorm Sandy</td>
<td>New Jersey</td>
<td>2012</td>
<td>Expected</td>
<td>Regional</td>
<td>Severe</td>
</tr>
<tr>
<td>(storm surge)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- NIST
- FEMA
- NOAA/NGDC

Moore, OK
Hoboken, NJ
Watsonville, CA
Anticipated Performance of Existing Built Environment

- Estimated anticipated performance (restoration of functionality) during recovery depends
  - Damage level - Condition and capacity of structural and nonstructural systems
  - Recovery time - Materials, equipment, and labor needed for restoration
  - Dependencies on other systems that may be damaged
### Example Summary Resilience Matrix

**Example: Routine, Localized, Minor disruption**

<table>
<thead>
<tr>
<th>Functional Category: Cluster</th>
<th>Overall Recovery Time for Hazard and Level Listed</th>
<th>Routine Hazard Level</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Phase 1 – Short-Term</td>
<td>Phase 2 – Intermediate</td>
</tr>
<tr>
<td><strong>Critical Facilities</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Buildings</td>
<td>90% X</td>
<td>90% X</td>
</tr>
<tr>
<td>Transportation</td>
<td>90% X</td>
<td>90% X</td>
</tr>
<tr>
<td>Energy</td>
<td>90% X</td>
<td>90% X</td>
</tr>
<tr>
<td>Water</td>
<td>90% X</td>
<td>90% X</td>
</tr>
<tr>
<td>Waste Water</td>
<td>90% X</td>
<td>90% X</td>
</tr>
<tr>
<td>Communication</td>
<td>90% X</td>
<td>90% X</td>
</tr>
<tr>
<td><strong>Emergency Housing</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Buildings</td>
<td>90% X</td>
<td>90% X</td>
</tr>
<tr>
<td>Transportation</td>
<td>90% X</td>
<td>90% X</td>
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<tr>
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</tr>
<tr>
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<td>90% X</td>
<td>90% X</td>
</tr>
<tr>
<td><strong>Housing/Neighborhoods</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Buildings</td>
<td>90% X</td>
<td>90% X</td>
</tr>
<tr>
<td>Transportation</td>
<td>90% X</td>
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<td>90% X</td>
<td>90% X</td>
</tr>
<tr>
<td><strong>Community Recovery</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Buildings</td>
<td>90% X</td>
<td>90% X</td>
</tr>
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<td>Transportation</td>
<td>90% X</td>
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<td>90% X</td>
</tr>
</tbody>
</table>

**IOWA 2014**
### Example Summary Resilience Matrix

**Example:** Expected, Community, Moderate

<table>
<thead>
<tr>
<th>Functional Category: Cluster</th>
<th>Overall Recovery Time for Hazard and Level Listed</th>
<th>Expected Hazard Level</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Phase 1 – Short-Term</td>
<td>Phase 1 – Short-Term</td>
</tr>
<tr>
<td></td>
<td>Days</td>
<td>Days</td>
</tr>
<tr>
<td></td>
<td>Days</td>
<td>Days</td>
</tr>
<tr>
<td></td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

**Critical Facilities**
- **Buildings:** 90%
- **Transportation:** 90%
- **Energy:** 90%
- **Water:** 90%
- **Waste Water:** 90%
- **Communication:** 90%

**Emergency Housing**
- **Buildings:** 90%
- **Transportation:** 90%
- **Energy:** 90%
- **Water:** 90%
- **Waste Water:** 90%
- **Communication:** 90%

**Housing/Neighborhoods**
- **Buildings:** 90%
- **Transportation:** 90%
- **Energy:** 90%
- **Water:** 90%
- **Waste Water:** 90%
- **Communication:** 90%

**Community Recovery**
- **Buildings:** 90%
- **Transportation:** 90%
- **Energy:** 90%
- **Water:** 90%
- **Waste Water:** 90%
- **Communication:** 90%
## Example Summary Resilience Matrix

**Example:** Extreme, Regional, Severe Disruption

<table>
<thead>
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<th>Functional Category: Cluster</th>
<th>Overall Recovery Time for Hazard and Level Listed</th>
<th>Extreme Hazard Level</th>
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<td>Phase 1 – Short-Term</td>
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<tr>
<td></td>
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<td>Days 1</td>
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Tokohu